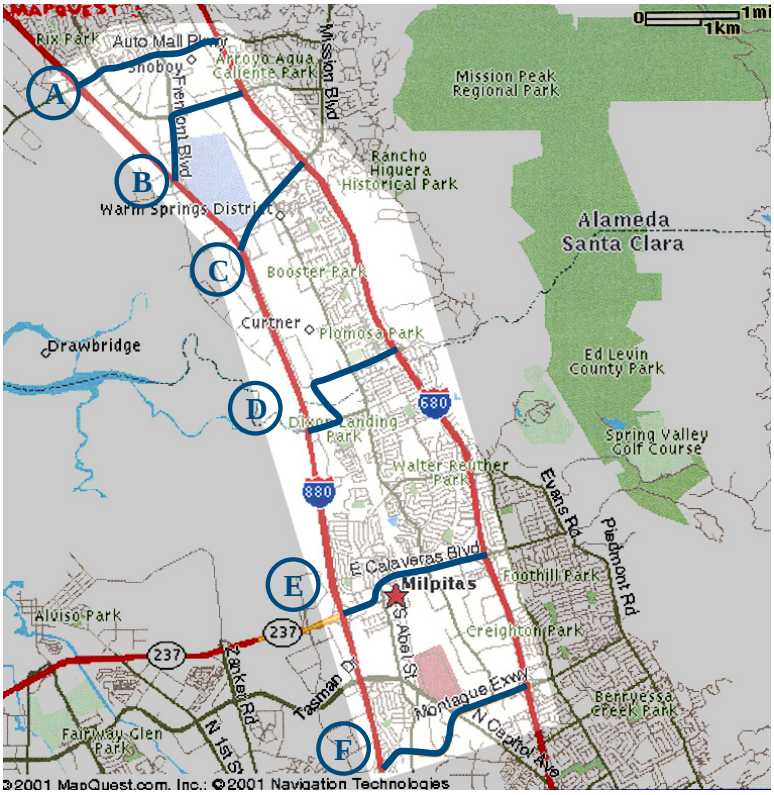
NOLTE

BEYOND ENGINEERING

Cross Connector I-680/I-880
Brainstorming Summary Report



In Alameda County and Santa Clara County

November, 2001

Prepared By: **Nolte Associates, Inc.**
1731 North First Street, Suite A
San Jose, CA 95112
Tel: (408) 392-7200
Fax: (408) 392-0101
www.nolte.com

Table of Contents

SUMMARY REPORT #1

I. Executive Summary

The purpose of this report is to document the efforts to date on the subject study, and provide the project's Management Steering Committee and affected agencies a recommendation to proceed with a more detailed conceptual study on a limited number of potential corridor improvements. This report summarizes the work completed to date in developing this limited number of corridor improvements, and defines the potential improvements recommended for further study.

In the Spring of 2001, a study was initiated to investigate the potential of a new cross connector freeway between Interstates 680 & 880. The freeway would be located somewhere south of Auto Mall Parkway in Fremont and north of Montague Expressway in Milpitas. After initial discussions, it was understood by the agencies involved that one project would likely not be politically feasible, nor would it adequately relieve east-west congestion throughout the defined corridor area. Instead, the focus was directed to developing a set of projects, or a program, that combined addresses the critical congestion issues in the study area. Subsequent traffic analysis and discussions resulted in the definition of eight (8) major traffic problems throughout the study area. It was further agreed by the affected agencies that there were four critical "problems" that must be specifically addressed for the congestion relief program to be effective. These four issues are summarized as follows:

- Intersection and Interchange improvements are required throughout the study area to reduce localized bottleneck locations.

- Direct HOV connection between Routes 680 and 880 for both of the movements described in the next two bullets must be incorporated into the program of improvements

- Traffic on Southbound Route 680 (from the Sunol grade) with destinations within the study area and to points beyond, generally in the "Golden Triangle," amount to 4100 VPH during peak a.m. conditions. Of the 4100 vehicles, 2300 are "pass through" traffic with destinations west of Route 880. 80% of those 2300, or 1840 VPH, cross from Route 680 to Route 880 north of Scott Creek Rd.

- Traffic on Northbound Route 680 (from east/south San Jose and beyond) with destinations within the study area and to points beyond, generally in the "golden triangle," amount to 4500 VPH.

As a result of a brainstorming session in July, 2001, roughly 100 alternatives, aimed at providing relief for any or all of the original eight (8) "problems," were identified and documented. Through a screening process, alternatives were subsequently eliminated over the following months. Currently, there are less than 25 alternatives still under consideration. Those alternatives have been combined into corridor improvements that will be further developed in the conceptual study. The corridor, definitions and improvements recommended for further study are as follows:

Corridor A – Auto Mall Parkway (AMP)

A1 - Increase capacity by widening AMP to six (6) lanes and improving operations at congested intersections.

A2 - Construct a new interchange with Osgood and AMP to grade separate the two local roadways and improve access to/from Route 680.

A3 - Reconfigure interchange with Route 680 to improve access to/from AMP.A1 - Increase capacity by widening AMP to six lanes and improving operations at congested intersections.

Corridor B – Fremont Blvd./Grimmer Blvd.

B1 - Provide new access between Routes 680/880 by constructing improvements primarily on the existing alignment, focusing on HOV connections at both freeways and creating HOV lanes or similar options (HOT lanes, reversible, etc.) on Fremont Blvd. and Grimmer Blvd.

B2 - Provide new access between Routes 680/880 by constructing a new freeway above grade.

Corridor C – Mission Boulevard

C1 - Construct a new freeway below grade under existing Mission Blvd. for mixed flow usage, HOV included, or HOV only.

C2 - Improve operations on Mission Blvd. by grade separating Warm Springs Blvd.

C3 - Improve operations of traffic to/from 680 from Mission Blvd by reconfiguring the freeway interchange.

Corridor D – Scott Creek Road / Dixon Landing Road

D1 - Increase the capacity and define a primary route for through traffic from Scott Creek Rd. to Milmont Dr. to Dixon Landing Rd.

D2 - Provide HOV movements utilizing Scott Creek Rd. median and new HOV only connections to Route 880.

D3 - Extend Kato Rd. to west of Route 880 to Fremont Blvd. focusing on directing Scott Creek Rd./Kato Rd. traffic to the new Dixon Landing Rd./880 interchange, with a further focus on HOV movements.

Corridor E – Calaveras Blvd. / Route 237

E1 - Increase capacity on Calaveras/237 by widening to six (6) lanes between Abel St. and Milpitas Blvd. Consider eight (8) lanes in places for auxiliary lanes and consider some grade separations.

E2 – Improve operations on Calaveras and Abel by grade separating the two facilities and constructing and interchange. This alternative may drive a consideration to improve local freeway operations with improvements at Jacklin Rd./Route 680 I/C.

E3 - Construct new aerial freeway parallel to and south of existing Calaveras Blvd. focusing on HOV movements.

E4 - Improve operations of traffic to/from 680 from Calaveras Blvd by reconfiguring the freeway interchange.

Corridor F – Montague Expressway

F1 – Widen to eight lanes between freeways (this project being undertaken by County Roads and Airports).

F2 – Improve operations/capacity with grade separation of Montague/Great Mall/Capitol and coordinate with proposed BART extension.

F3 - Improve operations/capacity with focus on HOV connectivity at Route 680 and Route 880. Consider extension of proposed HOV on 680 all the way to Montague, and not end at Route 237.

II. History

Interstates 680 and 880 serve as the main travel ways between Alameda County and Santa Clara County. Traffic along these routes has continued to increase as more commuters travel into the Silicon Valley, primarily the "Golden Triangle" area, from the Tri Valley area and the Central Valley. Currently, there are only two main direct connectors between the two North-South freeways within the study limits. These connectors are Mission Blvd. in the City of Fremont and Calaveras Blvd. in the City of Milpitas. For many years, these two routes have not been able to adequately handle the traffic volumes flowing East-West.

Previous studies have been performed for a new east-west freeway connector in the study area. In the late 1970's the South Bay Freeway route was designed with the intention of extending Route 237 to connect with I-680 near Mission Blvd.. In 1990, Caltrans prepared a Project Report Study (PSR) investigating six potential freeway connectors between I-680 and I-880. These alternatives ranged in cost from $211 million to $314 million.

Due to the high cost of the freeway alternatives in the Caltrans PSR, interim alternatives were also investigated that would allow relief to the direct connectors, but at a much lower cost. In 1997 a study was performed for the Alameda County Congestion Management Agency. This study, titled

"Mission Boulevard (Route 262) Express Lane Project Feasibility Study" focused on an overhead expressway route over the existing Mission Blvd..

Currently, the Valley Transportation Authority (VTA), along with its partners, (the Alameda County Congestion Management Agency (ACCMA), Alameda County Transportation Improvement Authority (ACTIA), the Cities of Milpitas and Fremont, Caltrans and the Metropolitan Transportation Commission (MTC)), has proposed a new study to investigate how to relieve traffic congestion and improve transportation routes within the I-680 and I-880 corridors in Northern Santa Clara and Southern Alameda Counties.

This proposed study, initiated in early 2001, has reviewed those previous reports and is developing a new strategy for improving transportation and relieving congestion within and between the region bounded by I-880 on the west, I-680 on the east, Auto Mall Parkway (Fremont) on the north, and Montague Expressway in Milpitas/San Jose on the south.

III. Process Definition

The primary effort for this element of the study consisted of meetings with the multiple agencies involved, led by the VTA, to better define the remaining process and timeline for project development. Specific items include:

- Meetings with City of Fremont, City of Milpitas, Caltrans, ACCMA, ACTIA, and VTA to discuss project status, history, goals, criteria, and other related issues that will influence the project development process.
- Development of roles, responsibilities and personnel expectations for each of the following groups:
  - Policy Advisory Committee (PAC) – Elected Officials.
  - Management Steering Committee (MSC) – Directors and Managers.
  - Technical Advisory Committee (TAC) – Senior Planners and Engineers.
- Develop approach and expectations for coordinating this study with the Silicon Valley Rapid Transit Corridor MIS Project, and other on-going projects in the corridor.
- Develop a schedule for implementation and preliminary "check-in" points with political bodies and community interaction.

The Technical Advisory Committee (TAC) has, from the beginning of the project, been meeting on a monthly basis. This TAC consists of members from the VTA, Caltrans, ACTIA, Fremont, Milpitas, MTC and ACCMA. The TAC agreed upon the process summarized in this report, which started with a problem definition exercise, followed by a brainstorming session. From the brainstorming session, current potential corridor improvements were derived. The remainder of this report provides more detail on each of these steps.

IV. Problem Definition

In order to properly define the problem, beyond obvious traffic congestion, specific analyses were performed that included the following:

- Identify origin/destination difficulties and prioritize critical movements now and in the future. There are four ingress/egress points to the project study area – these are the four corners of the I880/I680/Automall Parkway/Montague Expressway "rectangle". There are major movements to and from each quadrant at different times throughout the day. Basic demand and capacity evaluations were performed for each movement during peak hours.

- Determine General Plan level development that would affect these movements (i.e., residential, commercial, retail).

- Review current projects under construction, in design or being planned. Assess relationship to this study.

- Review and summarize available traffic data including initial characterization of traffic patterns. Determine what additional studies should be performed during detailed conceptual phase. Define the methodolgy to be used in assembling, analyzing and predicting traffic patterns for conceptual development.

The result of this effort is the problem definition report contained in Appendix B. This report summarizes the existing system, capacity and demand within the project area. This report also references available information, information requiring development, and initial assessment of impact on projects currently in development. An initial estimate of necessary capacity improvements is also included.

The report identifies eight primary areas or "problems" which are the major causes of the heavy congestion being recognized in the study area. These problems are listed below.

1. Freeways operate below capacity due to operational issues.

2. Arterial streets operate poorly and would be congested with only "internal" demand – Major issues exist near interchanges.

3. There is a need for continuous HOV movements E-W through the study area.

4. There are inconsistent arterials in the study area – changing geometry and poor intersections in locations.

5. 45% of E-W traffic is Through Trips.

6. 8,570 VPH from the 'select link' analysis travel westbound in the a.m. There is a capacity on the local streets of 14,000. Thus 60% of the local road capacity is taken up by 'through-trips.' (Which are only 45% of the total demand)

7. From the north (SB): 4100 VPH enter the project area. Of those from the north that are 'through-trips,' 80% cross from 680 to 880 north of Scott Creek. (2300 VPH from Sunol are bound to the Golden Triangle area) [Sunol to Golden Triangle]

8. From the south (NB): 4500 VPH enter the project area. [San Jose to Golden Triangle]

Note that by definition, problem 5 overlaps with problems 7 & 8. In order to differentiate between problems 1 & 2, problem 1 is more focused on freeway impacts, while problem 2 is more focused on local street impacts. Consequently, problems 2 and 6 are similar and would expect to benefit from similar type improvements.

Based on the interrelationships and further discussions with the TAC, problems 2, 3, 7, and 8 were determined to be the most critical traffic issues in the study area. It was agreed therefore that a program of improvements to relieve congestion in the project area, in order to be complete and acceptable to the affected agencies, must help alleviate traffic related to all four of the problems (2,3,7 and 8).

V. Alternatives Identification

With the process and the problem defined, a brainstorming process to develop "the full spectrum" of potential improvements was implemented. On July 31, 2001, at the Embassy Suites Hotel in Milpitas, a brainstorming session was held for the purpose of developing the list of potential projects/improvements that would reduce congestion in the east/west direction within the project limits. This brainstorming session contained members from the City of Fremont, the City of Milpitas, Caltrans, ACCMA, ACTIA, the VTA and the consultant team. Participants included those personnel regularly attending the TAC meetings, with additional members from the referenced agencies.

The alternatives presented were catalogued in numerical order as discussed at the meeting. During the meeting, 85 ideas, each labeled as an alternative, were recorded. Subsequent to the meeting, additional ideas were recorded, resulting in a current total of 98 alternatives. These alternatives were then classified into six (6) categories of potential improvements as follows:

A. **New Freeway** facility providing direct connection between Route 680 and Route 880. Formatted: Bullets and Numbering

B. **Traffic System Management (TSM)** improvements related to bus operations, bicycles, signage, or similar "non-roadway construction" elements. Formatted: Bullets and Numbering

B. **Modification of an existing local agency facility** for a significant reach (e.g. between Route 680 and Route 880).

C. **Intersection** or similar localized **improvements** to the current roadway network Formatted: Bullets and Numbering

E. **Interchange improvements** and/or creation of a grade separated interchange at an existing at-grade intersection. Formatted: Bullets and Numbering

F. **Non - Roadway Improvements (Rail, Park & Ride, etc.)** Formatted: Bullets and Numbering

From this brainstorming session, a matrix of alternatives was developed. These 98 alternatives are reflected in the attached "Alternatives Matrix" contained in Appendix E. This matrix places the alternatives into the categories above, identifies correlated alternatives, identifies "problems" addressed by the alternative, and presents a history of the screening process as discussed in the next section of this report.

VI. Alternatives Screening

Upon review of the major construction categories (I, III and V), it was evident that additional geometric development would be required for certain alternatives before they could be properly evaluated. An example of this is alternative 12, which simply suggests a through tunnel facility between the two freeways, but does not suggest a specific location. In these instances, some specific locations/geometry were developed. When this resulted in multiple alternatives, these were labeled 12A and 12B as shown in the matrix.

In addition to the basic elements listed on the alternatives matrix, it was determined at the August 21st TAC meeting that additional criteria was needed to continue to evaluate and compare the alternatives. The TAC mentioned the following items as potential evaluation criteria:

A. Overall Project Cost to include:

- Construction Costs
- Utility Relocation Costs
- Environmental Mitigation Costs
- Right of Way Acquisition – Permanent and Temporary
- Other soft costs (Design/Review)

B. Environmental Processing (possible to get approved?) — Formatted: Bullets and Numbering

C. Number of "Problems Solved" from Problem Definition Report list — Formatted: Bullets and Numbering

D. Overall Congestion Relief — Formatted: Bullets and Numbering

E. Constructability — Formatted: Bullets and Numbering

F. Benefits as part of an improvement package (i.e. combined with others, value is increased) — Formatted: Bullets and Numbering

G. Political acceptability — Formatted: Bullets and Numbering

H. Impacts to or from future improvements — Formatted: Bullets and Numbering

I. Implementability – Time to market — Formatted: Bullets and Numbering

In addition, subsequent to the meeting, the criteria used by the VTA in preparing the "VTP 2020" was reviewed. The basic areas considered in evaluating projects for this plan were:

A. Item #1 - Congestion Relief

B. Item #2 - Safety

C. Item #3 - Environmental Equity

D. Item #4 - Geographic Equity

E. Item #5 - Implementability

F. Item #6 - Economic Health

Formatted: Bullets and Numbering

Items 1 and 5 of the VTP criteria are directly mentioned in the TAC potential evaluation criteria list. Item 4 has been recognized as an important factor for this project area during all efforts to date. Items 2, 3 and 6 may become secondary factors or benefits of the short list of projects, but do not appear readily usable in this screening. Environmental Equity (3), as used for the VTP 2020 refers primarily to alternative modes and neighborhood impacts. Therefore, it appears the VTA factors are either taken into account in the original list of potential criteria or are not currently applicable.

In order to simplify the screening for the purpose of reducing the potential items to a short list of alternatives, Nolte utilized the following process:

Step 1: Identify the "problems solved" for every alternative listed. If an alternative does not solve any of the 8 problems, that alternative was removed from consideration.

Step 2: Identify and cancel out duplicate alternatives. If a larger scale alternative encompasses a more specific alternative, the more specific alternative was canceled and noted as available for development in the larger scale alternative.

Step 3: Perform initial subjective evaluation of each alternative relative to the following criteria. For each item, a "+/0/-" ranking was applied, with a "+" being good, etc.

- Congestion Relief
- Environmental Processing (Environmental Documentation and Permitting)
- Constructability/Construction Impacts
- Public Support

Formatted: Bullets and Numbering

Step 4: Develop initial ballpark project cost estimates within certain ranges.

Formatted: Bullets and Numbering

Step 5: If possible, based on above initial pass, eliminate some alternatives from further consideration due to justifiable reasons. A "three strikes (negatives), you're out" approach was adopted by the TAC.

Step 6: Rank and further develop alternatives based on input from TAC.

Step 7: After ranking, discussion and some broad-brush development, assemble "packages" or "corridor improvements" that provide minimum traffic congestion relief (problems 2, 3, 7, and 8).

Some of the alternatives are considered variations or "options" to multiple alternatives. For example, alternative #'s 9 and 10, Mixed Flow and HOV on OH Structure and "HOT" lanes, respectively, could be applicable for any Category I solution locations. Therefore, these ideas will be kept open but moved to a secondary, or "option", classification for this phase of the study. In other words, if a new freeway is built in the Fremont Blvd./Grimmer Blvd. corridor, it could include HOV, HOT and/or reversible lanes. The alternative will define the location and goal (more capacity), while the option will detail the implementation strategy.

Additional evaluation and ranking criteria discussed with the various agencies included the following:

- Conversion of an existing facility to a freeway may not bring significant increased capacity, but will carry significant construction and 'social' cost. Therefore, if a new parallel freeway is similar in other respects to a conversion, the conversion was eliminated from further consideration. Thus the focus on existing facilities is to improve operations/capacity working 'within the function' of the existing facility.

- As interchange capacity and operations are a major element of the movement from Route 680 to/from Route 880, 'spreading' the traffic will serve to maintain more consistent operations. Therefore, those alternatives that optimize underutilized interchanges, or create new connections within acceptable standards, rather than increase volumes on existing high demand interchanges, will be given higher rankings.

- Similarly, the philosophy of providing system redundancy is important, to account for impacts to the overall system when accidents or other localized impacts occur.

- The ability of an option to interact positively with the proposed/potential BART extension will be important in the overall effectiveness of an improvement.

Those alternatives that were eliminated from further consideration fall into one of the following areas:

O	=	*"Option" applicable to multiple alternatives*
X1	=	*Alternative removed from consideration as not solving any problem, or duplicated alternative.*
X2	=	*Removed - does not mitigate problems 2, 3, 7 or 8.*
X3	=	*Project already under development. This study assumes project will be built.*
X4	=	*Eliminated - "3 Strikes" (3 "-" evaluations).*
X5	=	*Benefit/Cost not positive relative to other options on corridor.*
X6	=	*Removed - No "+" evaluations, with some "-" alternatives.*

The matrix in Appendix E identifies why each alternative was removed from further consideration.

After the evaluations of September and October, there remain less than 25 alternatives for possible evaluation. These alternatives can be associated with the 6 corridors as follows:

Formatted: Bullets and Numbering

Corridor A - Auto Mall Parkway (alternative #'s 22, 24, 80)

Deleted: 7

Corridor B - Grimmer/Fremont (5, 76, 76.1)

Corridor C - Mission Blvd (14, 25, 26)

Deleted: 78,

Corridor D - Scott/Dixon (27, 32, 51, 67, 90.2)

Corridor E - Calaveras/237 (16, 18, 28, 64, 65A, 65B)

Corridor F - Montague/Tasman/Capitol (19, 31, 45, 68)

Furthermore, considering the corridors and opportunities for improvements within the corridor, the potential improvements for each corridor can be grouped into 14 potential corridor improvements. These improvements are "defined" primarily by the goal of improvements. In pursuit of these goals, the alternatives still under consideration will be further developed to allow more detailed evaluation.

The basic problem(s) solved by the corridor improvement are also identified below. Note the first letter of the improvement corresponds to the corridor under consideration. 'N' and 'S' on problems refers to 'North' and 'South' respectively, with North referring to traffic problems north of Route 237 (Sunol Grade traffic) and South referring to traffic problems south of Route 237.

Deleted: s

A1 - Increase capacity by widening AMP to six lanes and improving operations at congested intersections. (Alt's 22, 24, 80 – problems 2N, 7)

B1 - Provide new access between Routes 680/880 by constructing a new freeway above grade. (Alt 5)

B2 - Provide new access between Routes 680/880 by constructing a new "at grade" facility – either parallel to the existing to the south or by adding grade separations on the existing alignment. (Alt 76)

B3 - Provide new access between 680/880 by constructing improvements primarily on the existing alignment, focusing on HOV connections at both freeways and creating HOV lanes or similar options (HOT lanes, reversible, etc.) on Fremont Blvd. and Grimmer Blvd. (Alt 76.1)

C1 – Construct a new freeway below grade under existing Mission Blvd for mixed flow usage, HOV included, or HOV only. (Alt 14 – problem 3N, 7).

C2 – Improve operations on Mission Blvd. by grade separating Warm Springs Blvd.. (Alts 25, 26 – problems 2N, 7).

D1 – Increase the capacity and encourage a primary route for cut-through traffic from Scott Creek Rd. to Millmont Dr. to Dixon Landing Rd. Likely to include widening Kato Rd. west of Warm Springs Blvd.. (Alt's 32, 51, 67 – problems 2N, 7)

D2 – Provide HOV movements utilizing Scott Creek Rd. median and new HOV only connections to Route 880. Otherwise, similar to D1. (Alt 90.2 – problem 3N)

D3 – Extend Kato Road to west of Route 880 to Fremont Blvd. focusing on directing Scott Creek/Kato Rd. traffic to the new Dixon Landing Rd./880 interchange (Alt's 27, 90.2 – problems 2N, 3N, 7).

E1 – Increase capacity on Calaveras/237 by widening to 6 lanes between Abel Street and Milpitas Blvd. Consider 8 lanes in places for auxiliary lanes, and consider some grade separations (Alt's 18, 28, 64, 65A – problems 2N, 2S, 7, 8).

E2 – Construct new aerial freeway parallel to and south of existing Calaveras Blvd. focusing on HOV movements (Alt 16 – problems 3N, 3S, 7, 8?).

E3 – Improve local freeway operations with improvements at Jacklin Rd./Route 680 I/C (Alt 65B –problems 1, 2N)

F1 – Improve operations/capacity with focus on HOV connectivity at Route 680 and Route 880 (Alt's 19, 31, 45, 68 – problems 2S, 3S, 8).

F2 – Improve operations/capacity with grade separation of Montague/Great Mall/Capitol and coordinate with proposed BART extension. (Alt 31, problems 25, 35, 8)

Deleted: a

Deleted: 1

Deleted: partially

Deleted: .

Deleted: a

Deleted: a

Deleted: a

Deleted: , with possible connection as far as Zanker

Deleted: a

Deleted: 21,

Deleted: a

Deleted: a

Deleted: a

Deleted: a

From these improvements, it is then possible to assemble "programs" that address problems 2N, 2S, 3N, 3S, 7, and 8. It is anticipated problems 2 and 3 must be addressed for both counties (ie. 'N' & 'S'). The following matrix helps to picture the options available for assembling this program:

Problem	A1	B1	B2	B3	C1	C2	D1	D2	D3	E1	E2	E3	F1	F2
2N	X					X	X		X	X		X		
3N		X	X	X	X			X	X		X			
7	X	X	X	X	X	X	X		X	X	X			
2S										X			X	X
3S											X		X	X
8										X	X		X	X

The goal of the screening process was to find a workable number of corridor improvements that could be taken into the Conceptual Design phase. These corridor improvements have been developed to a very preliminary level to show the basic geometries of each improvement and to begin to assess impacts at a more detailed level. Along with these plans, "ball park" cost estimates were developed for each improvement.

VII. Recommendations

From the efforts to date, it is recommended that corridor improvements A1 through F2, as listed in Section VI of this report, be developed to the next level of detail.

Local agencies are encouraged to pursue additional non-roadway (Category II and VI) improvements as part of on-going programs.

VIII. Future Steps

The tentative schedule for completing the conceptual report is November 2002. A detailed schedule, which assumes a new freeway will be constructed, is shown on the following page.

Discuss funding availability, potential sources, approach?

Discuss public involvement elements?